



South Carolina River News



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Floodplains and Floodplain Management

Floodplains are the areas adjacent to stream channels that serve as nature's temporary storage space for the floodwaters and sediment produced by a watershed. The flooding of floodplains may be frequent or rare depending upon the regional climate and the presence of water-flow control structures on the stream such as dams. Typically, South Carolina rivers experience flooding events that inundate portions of the adjacent floodplains several times a year.

Throughout history, people have settled next to waterways, on rivers and floodplains, because of the advantages they offer in transportation, commerce, energy, water supply, soil fertility, and waste disposal. In spite of these benefits, however, our historic attraction to settling along rivers and streams is not without its drawbacks. Floods have caused a greater loss of life and property, and have disrupted more families and communities in the United States than all other natural hazards combined.

Today, citizens and communities throughout the nation are grappling, perhaps more seriously than ever, over their use of floodplains. They may choose to use these flood-prone lands for primarily economic development purposes, or they may take action to better balance the economic and environmental benefits of floodplains.

Floodplain management is a process of planning and making decisions to achieve wise use of floodplains and it involves programs of corrective and preventive measures which reduce and avoid future flood damage. Whether it employs structural approaches such as levees and dams, non-structural approaches such as setbacks from rivers and streams, or a combination of both, floodplain management aims to reduce the loss of life and damage caused by floods and preserve and restore the natural resources

and functions of flood plains (which, in turn, lessen damage potential). Traditional concerns of floodplain management are being



A portion of Hwy. 17 was closed during the flooding that occurred as a result of Hurricane Floyd in 1999.

increasingly integrated with the concerns of water quality, habitat protection, land use, insurance, cultural and historical preservation, economic development, disaster preparedness, stormwater management, and others.

Communities that have a flood problem often want to see it solved as quickly as possible, they may even want a flood control project that will keep the problem away forever. However, such a response to flooding has many shortcomings, most notably expense, environmental disruption, and future watershed development that can make a project obsolete. There are many alternatives to

building a flood control project, ranging from managing development in floodplains and their watersheds, to acquiring or floodproofing buildings and infrastructure, to educating citizens about how to protect themselves and their property from floods.

There is no shortage of possibilities for dealing with a flood problem. The key is to select options that are appropriate for the local situation through a process of mitigation planning, a systematic, objective review of the flood problem and what can be done about it.

The National Flood Insurance Program (NFIP) is used for fostering and accelerating the principles of floodplain management. Flood insurance is available to floodprone communities through the NFIP, which is administered by the Federal Emergency Management Agency (FEMA). Prior to the NFIP, flood insurance was generally unavailable from the private sector and most State and communities did not regulate floodplain development. Dependence was instead placed on the construction of flood control projects such as levees, dams, and channels to reduce flood damage. Despite the expenditures of billions of dollars for these flood control projects, annual flood damages and disaster assistance costs were increasing at a rapid pace. In response to this worsening situation, congress created the NFIP in 1968 to reduce flood losses and disaster relief cost by guiding future development away from flood hazard areas where practicable, requiring flood-resistant design and construction, and transferring costs of losses to floodplain occupants through flood insurance premiums.

The NFIP was broadened and modified by the Flood Disaster Protection Act of

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Federal Flood Insurance Program - An Overview

Alfred H. Vang, Deputy Director, SC Department of Natural Resources

As of 2000, South Carolina had over 131,000 flood insurance policies in effect that generated over \$52 million in premiums and provided over \$19 billion in coverage. These premiums – not public funds – pay for the National Flood Insurance Program's programs.

The National Flood Insurance Program (NFIP) generated over \$1.5 billion in premiums annually from policyholders. The National Flood Insurance Fund pays flood insurance claims out of the premium money collected. A federal policy fee of \$30.00 is charged for each policy. In 1997 this amounted \$85 million of which \$45 million paid for flood insurance studies and surveys.

The South Carolina Department of Natural Resources, along with the other 49 states, receives an annual grant from the Federal Emergency Management Agency (FEMA) to provide technical assistance to communities and their citizenry on the National Flood Insurance Program. The total allotment for all the states under the Community Assistance Program- State support Services Element is only \$5 million – of which South Carolina receives approximately \$123,610. These funds originate from the federal policy fee. The NFIP has not received an appropriation of state tax dollars since 1986.

The NFIP does have borrowing authority and in October 1995 a flood in Louisiana required the NFIP to initiate this option. It borrowed \$917 million and in the last six months has reduced the NFIP amount to \$522 million. In addition the NFIP has paid over \$90 million in interest on the loan.

An important issue that FEMA and the NFIP are currently addressing deals with repetitive property losses. As of 11/30/97, South Carolina had 594 structures that had sustained 1,392 losses, valued at \$28,597,641. We currently rank 15 in the country. Voluntary buyouts are one means of dealing with this issue but are probably not realistic. Those areas that are most prone to repetitive losses, such as coastal properties. When the NFIP was created in the 1960s it was based on the premise that


the average life of a structure was 50 years. We can all drive down Meeting Street in Charleston and see that this assumption was wrong. The NFIP is celebrating its 30th anniversary this year and many changes have occurred in that time. Structures subject to the one percent chance flood must be brought into compliance with local floodplain management regulations when the structures are substantially damaged or substantially improved. The National Flood Insurance Reform Act of 1994 provides a new benefit under the standard flood insurance policy to pay up to \$15,000 to retrofit structures that have been substantially damaged by a flooding event. The NFIP also provides incentives through the Community Rating System to reward policyholders in those communities who initiate actions to reduce the flood threat. Again, these incentives are paid for from the flood insurance premium pool and not from our tax dollars.

With its partners the Association of State Floodplain managers and the National Emergency Management Association, FEMA is developing a national repetitive loss strategy and South Carolina has been selected to participate in the strategic process.

In its recent report "Higher Ground," the National Wildlife Federation proposed several recommendations to address the problem of repetitive payments for flood losses. A comprehensive review of national flood plain management approaches was completed in 1994 in a report titled "Sharing the Challenge." Commonly known as the "Galloway Report," it emphasized that no single level of government, no single agency, no single program can solve these problems. As the report said, "There are no silver bullets in the floodplain management business, no single actions that will suddenly reduce the vulnerability of those who are currently at risk or stave off placing others in the same position." The title alone "Sharing the Challenge" is meant to convey the message that a cooperative effort will be needed between federal, state, and local government as well as the private sector to effectively control flood losses and suffering.

The role of state and local government in this process also needs addressing. State and local governments often do not have enough support to make tough land-use decisions. The federal government should provide incentives for state and local governments to do more. An example is a sliding cost-share for disaster assistance. The State might establish a mitigation trust fund to assist communities in implementation of mitigation actions. Land-use decisions are made at the local level. Local governments are encouraged to take the necessary steps to mitigate future flood losses. While it is convenient to point the finger at Uncle Sam, we at some point need to quit blaming the federal government and accept the responsibility for poor planning and development decisions at the local level. Federal agencies must see their role not as "doing" planning and projects, but rather as facilitators to develop state and local capability through programs, technical assistance and funding cost-sharing. This should strengthen state and local programs to better foster floodplain management. State and local governments must address long-term sustainability issues in order to make lasting changes in human developmental patterns.

South Carolina has not experienced a major natural disaster in nine years. We need to be developing long-term hazard mitigation strategies now to enable our citizens to recover with minimal social and economic impacts. We hope that you and others around the state will join us in support of this position with our state and local leadership.

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Floodplain Wetlands: Important Amphibian Breeding Habitats

John Garton, Duke Energy

Landforms along our rivers can vary from steep scenic bluffs to flat areas that have been shaped by the river over eons of time. These flat areas currently serve as the river's floodplain. The floodplain is "where the river goes" during times of extreme precipitation events. It is the area where floods can safely spend their energy and deposit their silt load. During periods of high flow these floodplain areas can become completely inundated.

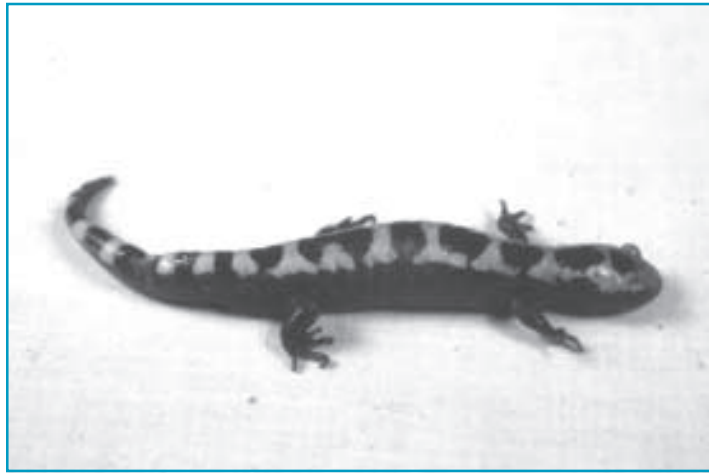
However, within most floodplains there are natural "low spots" that seasonally serve as temporary pools and small lakes. These areas, with no natural outflow, typically fill during the prolonged rain events that occur in late fall/winter, and then dry up by mid summer.

The conditions created by these floodplain pools, and their location adjacent to forested uplands, makes them very useful as breeding locations for certain amphibian species. Two of the more notable and widespread of these species are the marbled and spotted salamanders, a pair of closely related species that utilize these floodplain pools from fall through summer, and then depend on the pools drying up.

Many common salamanders are brown to gray in color and do not show any special coloration. Not so for the marbled and spotted salamanders, both of which are chunky and beautifully marked 4 to 6 inch-long animals. Marbled salamanders have "marbled" black and white markings across their backs, while spotted salamanders have two rows of large orange to yellow spots from their heads to their tails. Partially because of its beautiful coloration, and statewide distribution, the spotted salamander has been designated as the state amphibian of South Carolina.

Marbled and spotted salamanders belong to a group known as the mole salamanders. This name comes from the fact that the adults spend much of their time underground, in forested areas along slopes adjacent to the floodplains. Sometime in mid fall (Oct to

November) adult marbled salamanders migrate in mass to the location of the floodplain pools (at this time the pools have not filled with water). The adults court, mate, and females lay eggs in the areas which will soon be inundated by winter rains, but as yet remain dry. The female excavates a shallow "nest" in the moist soil under a log, deposits her complement of 50 to 100+ eggs in this depression, and remains coiled about them. The eggs develop, and the larvae remain in the eggs until the winter rains flood the pools and cover the eggs. The eggs then hatch immediately, and the small larval salamanders



Marbled Salamander

emerge. The larvae are totally aquatic, breathe with external gills, and prey on the numerous small invertebrates that also inhabit the pools.

By late January, or early February, the marbled salamander larvae are an inch in length. At this time they are likely the top-level predator within their floodplain pools – they are abundant, and they are "tigers". Then, on a mild midwinter night when it has been raining for hours, the stage is set for the entrance of the marbled salamander's close relative (and rival), the spotted salamander. Spotted salamanders "delay" their mating and egg laying until the floodplain pools have been filled with water for some time, and the water is a stew with numerous invertebrates to serve as their food. Then hundreds of animals come to each pool on the same night for a mass ritual that includes a complex mating dance and subsequent egg laying by females. Eggs are attached to twigs

in the water and hatch within a few days (depending on water temperature). Larvae are similar in looks and behavior to those of marbled salamanders. As soon as the eggs are laid, the adults leave the pools. During the rest of the year adult marbled and spotted salamanders are difficult to find, except on rainy nights when they move about on the surface of the ground.

As winter turns to spring the pools are alive with a) salamander larvae, tadpoles (larvae of various frogs and toad species which also utilize the pools for breeding) and great numbers of invertebrate species, many of which also depend on these temporary pools for their survival. By mid summer the pools typically begin to dry up and the larval marbled and spotted salamanders are ready to transform into adults - when they will leave the pools. Transformation occurs over a several week period in June/July. By drying up in late summer the pools perform another important function in the ecology of these salamanders - they insure that fish populations will not become established in the pool areas (fish would be major predator, and source of competition, related to salamander larvae).

For marbled and spotted salamanders the floodplain pools are a critical part of their lives. Equally important are adjacent upland forested areas where adults can successfully spend much of their lives, the period of drying of the pools which precludes fish populations, and the abundance of invertebrate species which also live their lives based on the rhythm of these temporary wet areas. As in much of the life around our rivers, what we observe at any given time regarding salamanders and other critters in floodplain pools, is likely only part of a more complex system.

Continued from page 1

1973, which requires the purchase of flood insurance as a condition for receiving any form of Federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions. The NFIP has mapped floodplains in over 20,000 communities and over 18,400 communities now participate in the program. Many States and communities have established floodplain management programs and adopted floodplain management statutes and regulations that go beyond NFIP requirements.

The National Flood Insurance Reform Act (NFIRA), signed into law in 1994, strengthened the NFIP by providing for mitigation insurance and establishing a grant program for State and community flood mitigation planning projects. The NFIRA also codified the Community Rating System

(CRS), established objectives for CRS and directs that credits may be given to communities that implement measures to protect natural and beneficial floodplain functions and manage the erosion hazard. The CRS is an incentive program whereby communities that exceed the minimum requirements of the NFIP secure reductions in the flood insurance premiums for their residents. Approximately 940 communities are currently participating in CRS. The policies in the CRS communities represent over 60 percent of all NFIP flood insurance policies currently in place.

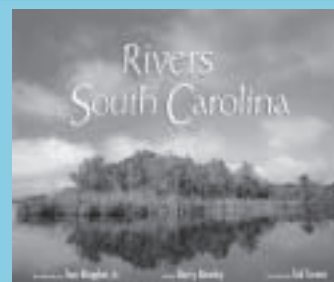
Examples of flood mitigation include elevating homes and business above the base flood (a flood having a percent chance of being equaled or exceeded in a given year), relocating homes out of the flood plain, and minimizing the vulnerability to flood damage through both structural and nonstructural means.

Editors Note: This article was compiled by Bill Marshall (SCDNR) using information sources of FEMA and the Association of State Floodplain Managers. For more information on floodplains and floodplain management, please contact the following sources:

SCDNR Flood Mitigation Programs, 2221 Devine Street; Suite 222, Columbia, SC 29205, (803) 734-9100. <http://www.dnr.state.sc.us/water/envaff/flood/scnfip.html>

Federal Emergency Management Agency (FEMA) 500 C Street, SW Washington, DC 20472, (202) 646-4600. <http://www.fema.gov>

Association of State floodplain Managers, 2809 Fish Hatchery Road, Suite 204, Madison, WI 53713 (608) 274-0123. <http://www.floods.org>



the Rivers of **South Carolina**

Well-known South Carolina Photographer Tom Blagden, Jr., takes you on a pictorial journey down South Carolina's waterways, capturing their beauty on film. Barry Beasley's insightful essays bring the rivers to life and help increase our awareness of the challenges involved in protecting our rivers for future generations of South Carolinians. He introduces the reader to special individuals whose devotion to rivers has created strong, grassroots conservation movements. The South Carolina Department of Natural Resources' River Conservation Program is proud to offer the Rivers of South Carolina. All proceeds go directly to the South Carolina Scenic Rivers Trust Fund. This fund was established in 1989 to help fund river education, conservation and management of South Carolina's Scenic Rivers. To obtain a copy of this book, please mail a check for \$44.25 (includes postage) made payable to SCDNR to our address shown on this newsletter.



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